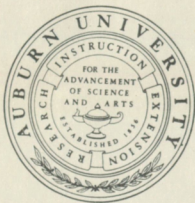


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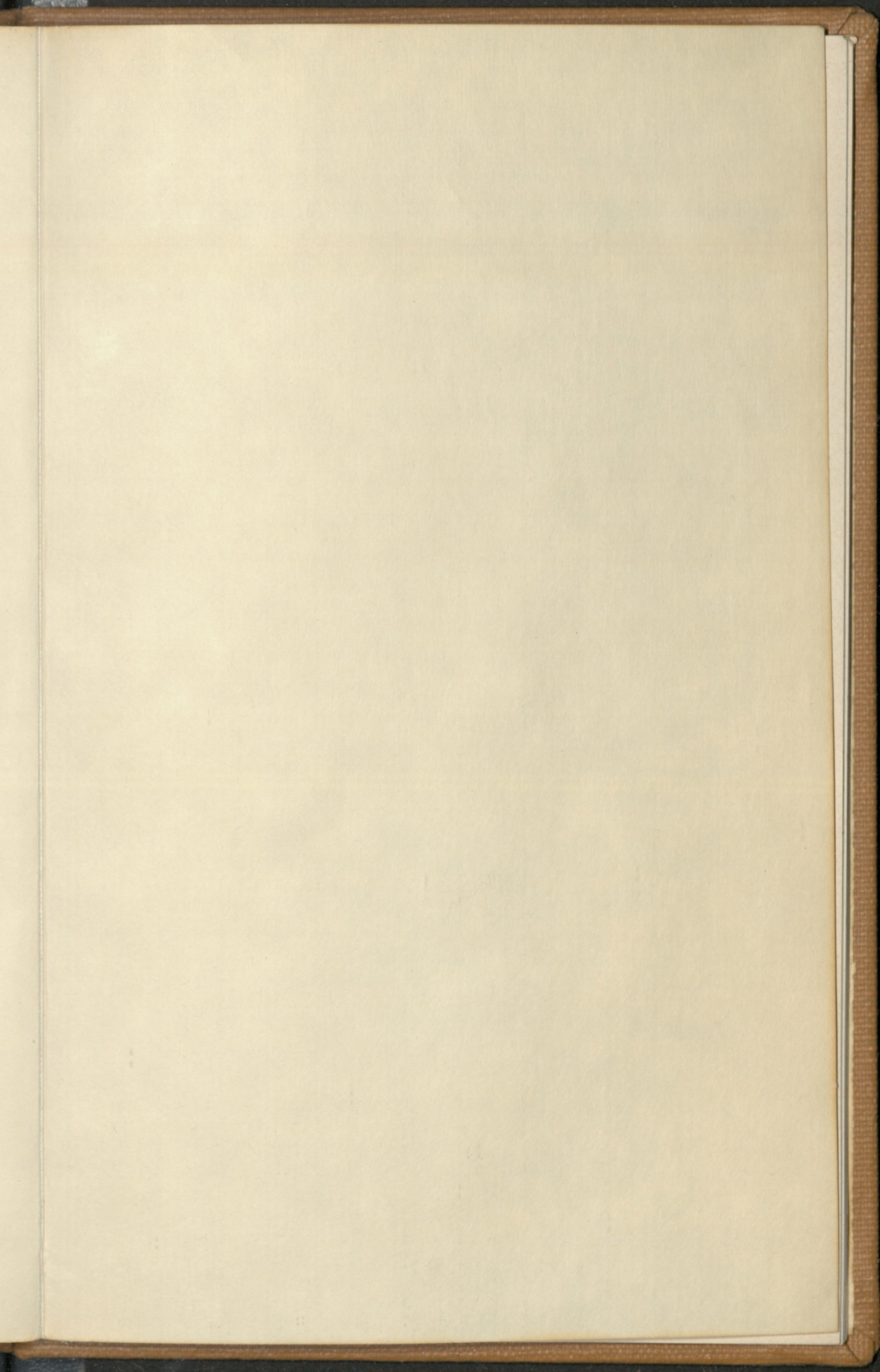


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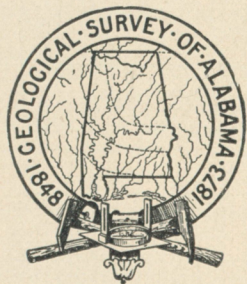
GEOLOGICAL SURVEY OF ALABAMA
WALTER BRYAN JONES, PH. D., STATE GEOLOGIST

BULLETIN NO. 38

PHYSICAL DIVISIONS OF NORTHERN
ALABAMA

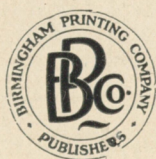
BY
WILLIAM DRUMM JOHNSTON, JR.

PREPARED IN COOPERATION WITH THE UNITED STATES
GEOLOGICAL SURVEY



UNIVERSITY, ALABAMA

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LETTER OF TRANSMITTAL

University, Alabama,
May 8, 1930.

HON. BIBB GRAVES,
Governor of Alabama,
Montgomery, Alabama.

Sir: I have the honor to transmit herewith the manuscript on "Physical Divisions of Northern Alabama", by William Drumm Johnston, Jr., of the United States Geological Survey, with the request that it be printed as Bulletin No. 38 of the Geological Survey of Alabama. This report was prepared in connection with the survey of the ground-water resources of Alabama, in cooperation with the United States Geological Survey.

Very respectfully,

WALTER B. JONES,
State Geologist.

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PHYSICAL DIVISIONS OF NORTHERN ALABAMA

(Numbers in parentheses correspond with those used by Fenneman in Assoc. Am. Geographers, Ann., vol. 18, No. 4, December, 1928)

MAJOR DIVISION	PROVINCE	SECTION	DISTRICT	CHARACTERISTICS
Atlantic Plain	Coastal Plain	East Gulf Coastal Plain (3d)	Marginal	Old belted coastal plain.
			Ashland Plateau	Maturely dissected peneplain on disordered crystalline rocks; strong relief.
	Piedmont Province	Piedmont Upland (4a)	Opelika Plateau	Submaturely dissected peneplain on disordered crystalline rocks; moderate relief.
			Weisner Ridges	Maturely dissected monoclinal mountains; strong relief.
	Valley and Ridge Province	Tennessee section (6a)	Coosa Valley	Mature plain with structural ridges of low relief.
			Coosa Ridges	Synclinal maturely dissected ridges of moderate relief.
			Cahaba Valley	Faulted monoclinal limestone valley of moderate relief.
			Cahaba Ridges	Monoclinal maturely dissected ridges of moderate relief.
			Birmingham-Big Canoe Valley	Faulted anticlinal limestone valley of moderate relief.
			Lookout Mountain	Submaturely dissected synclinal plateau of moderate relief.
Appalachian Highlands	Appalachian Plateaus	Cumberland Plateau (8f)	Wills Valley	Anticlinal tripartite valley of moderate relief.
			Sand Mountain	Submaturely dissected synclinal plateau of moderate relief.
			Murphree Valley	Faulted anticlinal valley of moderate relief.
			Blount Mountain	Submaturely dissected synclinal plateau of moderate relief.
			Squatachie Valley	Anticlinal tripartite valley of moderate relief.
			Warrior Basin	Synclinal submaturely to maturely dissected plateau of moderate relief.
	Interior Low Plateaus	Highland Rim (11a)	Jackson County Mountains	Submaturely dissected plateau of strong relief.
			Little Mountain	Submaturely dissected monoclinal ridge of moderate relief.
			Moulton Valley	Monoclinal limestone valley of low relief.
			Tennessee Valley	Young plateau of moderate relief.
Interior Plains	Interior Low Plateaus	Highland Rim (11a)		

INTRODUCTION

In 1928 Fenneman⁽¹⁾ defined the physiographic divisions of the United States and traced their boundaries. During the field seasons of 1928 and 1929 the writer was engaged in a study of ground-water in the Paleozoic rocks of northern Alabama, conducted under a cooperative agreement between the Geological Survey of Alabama and the U. S. Geological Survey. In compiling and arranging his field data the need for more detailed physical divisions of the area became apparent, and a scheme of divisions based upon Fenneman's system was prepared.

Fenneman defined and used divisions of three orders of magnitude, which he called major divisions, provinces, and sections. In Alabama the divisions which he proposed were found to be in complete agreement with the writer's field observations and office studies and they are here retained as defined. In characterizing his divisions Fenneman⁽²⁾ says:

The continent of North America is first divided into eight strongly characterized parts, all of these being represented in the United States and all but two of them in Canada. These are called *major divisions*. The term "division" can not, however, be restricted to this one sense. Units of the next smaller order are here called *provinces*, many of them having borne that designation for a long time though without assigned limits. Units of the third order are here called *sections*. The word *district* is sometimes used for divisions of low, generally undetermined order whose boundaries may be as yet undefined.

The present writer adopts the term *district* for definite physical divisions whose order is below that of sections and defines and describes the boundaries of those districts in Alabama lying within the Highland Rim Plateau, Cumberland Plateau, Tennessee section of the Valley and Ridge province, and Piedmont Upland.

This paper contains little that is new. Most of the district names here adopted are in common use, and descriptions of all the physical features mentioned have appeared in the older literature.⁽³⁾ It does, how-

(1) Fenneman, N. M., Physiographic divisions of the United States, 3d ed.: Assoc. Am. Geographers Annals, vol. 18, No. 4, 1928.

(2) Idem, p. 271.

(3) Adams, Geo. I.; Butts, Charles; Stephenson, L. W.; and Cooke, Wythe; Geology of Alabama, Alabama Geol. Survey, 1926.

Butts, Charles, U. S. Geol. Survey, Geol. Atlas, Birmingham Folio (No. 175), 1910; Bessemer-Vandiver folio (No. 221), 1927.

Harper, R. M., Economic Botany of Alabama, pts. 1 and 2, Alabama Geol. Survey, 1913 and 1928. Presents a combined physiographic and botanic division of Alabama.

Hayes, C. W., Geology of northeastern Alabama and adjacent portions of Georgia and Tennessee, Alabama Geol. Survey, 1892.

U. S. Geol. Survey, Geol. Atlas, Stevenson folio (No. 19), 1895, Gadsden folio (No. 35), 1896.

Physiography of the Chattanooga district; U. S. Geol. Survey Nineteenth Ann. Rept., pt. 2, pp. 9-58, 1899.

Hayes, C. W., and Campbell, M. R., Geomorphology of the southern Appalachians: Nat. Geog. Mag., vol. 6, pp. 63-126, 1894.

McCalley, Henry, Coal Measures of the plateau region of Alabama, Alabama Geol. Survey, 1891.

The Valley regions of Alabama, Alabama Geol. Survey, pt. 1, Tennessee Valley region, 1896; pt. 2, Coosa Valley region, 1897.

Smith, E. A. Geology of the Coastal Plain of Alabama, Alabama Geol. Survey, 1894.

ever, bring together these scattered descriptions and tentatively sets forth a scheme of division which may serve as a physiographic basis for geographic studies.

The geologic map of Alabama accompanying the "Geology of Alabama" can advantageously be used in reading this paper, as place names and geologic boundaries are there shown.

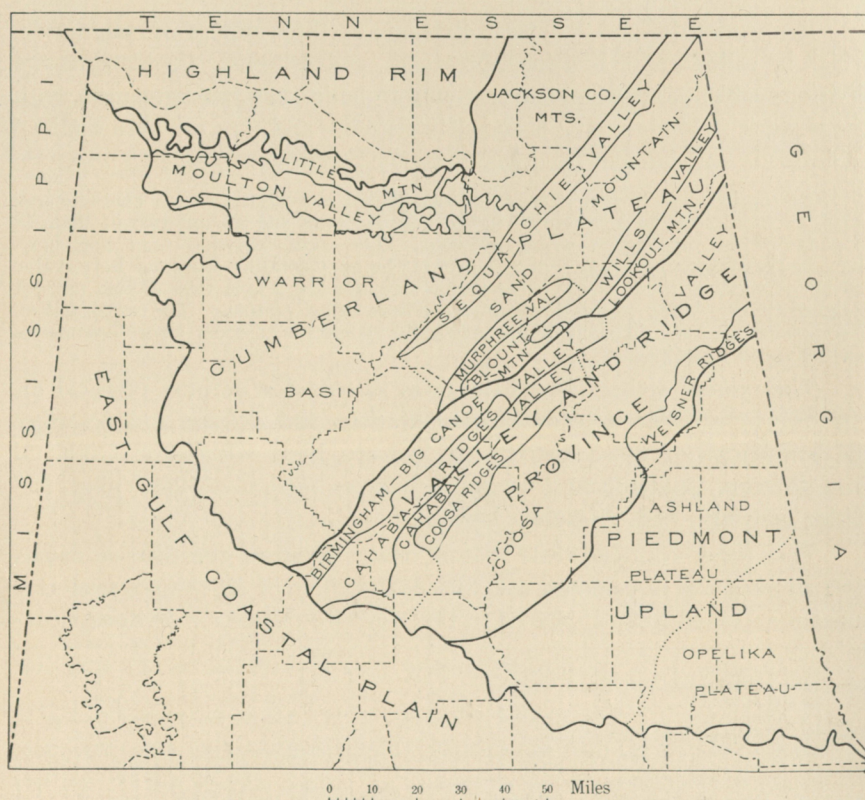


FIGURE 1. Physical divisions of Northern Alabama.

EAST GULF SECTION OF THE COASTAL PLAIN PROVINCE

The inner edge of the Coastal Plain forms the southern and western boundary of the Appalachian Plateaus, Valley and Ridge province, and Piedmont province in Alabama. The writer's field acquaintance with the Coastal Plain is confined to its inner margin, where the maturely eroded Tuscaloosa formation rests upon the southward-sloping Cumberland peneplain. The province is introduced in this paper solely to define the southern boundary of the divisions to the north, and no attempt is made to subdivide it.

PIEDMONT UPLANDS SECTION OF THE PIEDMONT PROVINCE

The Piedmont Upland is a submaturely dissected surface developed upon disordered igneous and metamorphic rocks. From the end of the Appalachian revolution until middle Cretaceous time the area was subjected to peneplanation.⁽¹⁾ Subsequent uplift of this peneplaned surface rejuvenated the sluggish streams, and post-Cretaceous erosion has developed the present land forms.

The writer's first-hand knowledge of the Piedmont province in Alabama is limited to observations made during a two-day automobile trip within the area and the district divisions here used are those given by Adams.⁽²⁾

(1) Shaw's contention that the Appalachian peneplains are much younger than formerly supposed seems well taken in the light of recent studies of western peneplains of late Tertiary age. Until the eastern peneplains are correlated with major unconformities in the Tertiary rocks their age must remain in doubt. In this paper the writer follows the older age assignment of Hayes and Campbell.

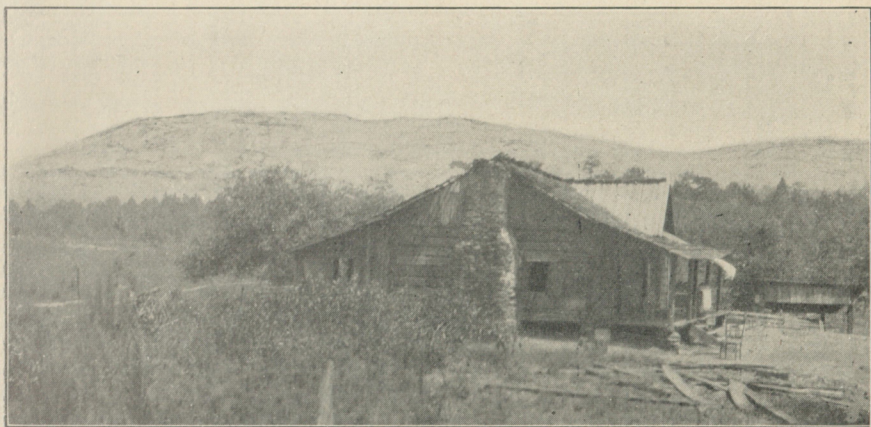
(2) Adams, G. I., *Geology of Alabama*, pp. 26-27, Alabama Geol. Survey, 1926.

PLATE 1



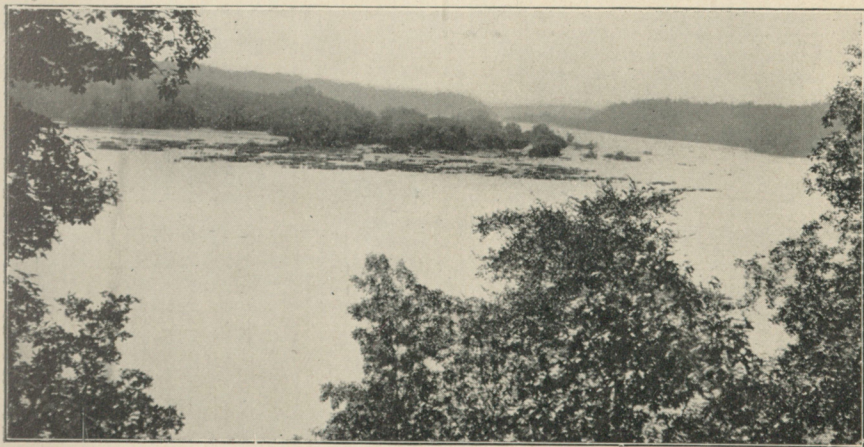
VIEW ON THE OPELIKA PLATEAU

Looking north from a point 2 miles west of Camp Hill, Tallapoosa County. The parallel lines are strips of turf left to prevent wash in contour cultivation. Photo by Chas. Butts, United States Geological Survey.



VIEW ON CHEAHA MOUNTAIN

The highest point in the State, in the southwest part of Cleburne County. Its altitude is 2,407 feet above sea level. Looking southeast. Photo by Walter B. Jones, Geological Survey of Alabama.



LOOKING DOWN COOSA RIVER FROM THE NARROWS ABOUT 6
MILES SOUTHEAST OF SHELBY, ALA.

Shows surface of Ashland plateau incised by the river to a depth of 300 feet. Photo by Chas. Butts, United States Geological Survey.

ASHLAND PLATEAU

The Ashland Plateau district lies in Cleburne, Calhoun, Talladega, Clay, Randolph, Coosa, Elmore and Tallapoosa counties. Adams⁽¹⁾ gives the following description of it:

The higher topographic division of the Piedmont Upland is the Ashland Plateau, which is diversified by ridges. It is the mountainous portion of the Piedmont and includes Cheaha Mountain, the highest point in the State. This point is at the northern end of Talladega Mountain or Rebecca Mountain, which has been called the Blue Ridge in Alabama but is not identical with the Blue Ridge proper of the Appalachian region.

Most of the surface of the Ashland Plateau lies at altitudes of 1,000-1,100 feet above sea level in the northern part and descends to 500-600 feet in the southwest part. The northeastern portion is drained by Tallapoosa and Little Tallapoosa rivers. The southeastern portion is drained by tributaries of Tallapoosa River, and the northwestern and southwestern parts by streams that flow to Coosa River. The area is well dissected. The valleys are narrow, and the cultivated lands are on the general upland, which has a rolling surface. The valleys and narrow ridges are not generally inhabited.

The ridges are all due to the presence of harder rocks, and their trends indicate structure. Black Jack Mountain, altitude 1,350 feet above sea level, near the border of Randolph County, just east of the State line in Georgia, is an isolated peak or monadnock. Many of the minor streams are influenced locally by the structure, but the ridges are crossed by the larger streams, which are antecedent.

Boundaries.—On the west the inner edge of the Ashland Plateau follows the western margin of the Talladega slate, expressed by the topographic break between the western slopes of Rattlesnake and Horseblock Mountains (Anniston quadrangle) and the Choccolocco Valley. South of Anniston the boundary continues south and west along the western slope of the Talladega Mountains (Ashland quadrangle) and the Rebecca Mountains (Talladega quadrangle), thence south to the eastern margin of the Talladega slate, which it follows south and west to the Coastal Plain.

On the east there is no topographic break between the Ashland and Opelika plateaus but they gradually blend over a wide belt. Following Adams the writer has drawn a generalized boundary along the contact of the Archean with the younger crystalline rocks.

The topography of this district is shown upon the maps of the Tallapoosa, Anniston, Talladega, Ashland, Wedowee, Wetumpka, and Dadeville quadrangles.

(1) Idem, pp. 26-27.

OPELIKA PLATEAU

The Opelika Plateau is coextensive with the area underlain by Archean rocks in Randolph, Chambers, Tallapoosa, and Lee Counties. Its surface is an old peneplain which has been uplifted and incised by tributaries of the Chattahoochee and Tallapoosa rivers. Adams says:⁽¹⁾

These rivers have cut valleys about 200 feet below the general surface. Portions of the valleys of High Pine Creek in Alabama and Town Creek in Georgia, which are minor streams, lie along the border of the Archean rocks between Tallapoosa and Chattahoochee rivers.

There are no striking topographic features in the Opelika Plateau. Away from the breaks near the river this plateau has a gently diversified surface that is largely cultivated. The equivalent of the Opelika Plateau in Georgia is the Greenville Plateau,⁽²⁾ which is more diversified.

Boundaries.—On the west the Opelika Plateau merges with the Ashland Plateau, and the boundary is arbitrarily drawn along the western margin of the Archean rocks. On the east the district continues into Georgia, and on the south it ends at the inner edge of the Coastal Plain.

The topography of this district is shown on the maps of the Wedowee, Opelika, and Dadeville quadrangles.

(1) Adams, G. I., p. cit., p. 26.

(2) LaForge, Laurence, Georgia Geol. Survey Bull. 42, pp. 77-78, 1925.

TENNESSEE SECTION OF THE VALLEY AND RIDGE PROVINCE

The Valley and Ridge province in Alabama is marked by northeastward-striking valleys and ridges developed upon sandstone, shale, limestone, and dolomite of Paleozoic age. Over much of this province the Cumberland Peneplain has been destroyed, and the land surface is a result of later erosion cycles.

In Alabama the adjoining provinces are higher and are bounded by outward-facing escarpments; hence this province is often called the Appalachian Valley.

WEISNER RIDGES

The Weisner Ridges, in Calhoun, Cherokee and Cleburne counties, are a series of maturely dissected monoclinal mountains of strong relief. They are developed upon the resistant Weisner quartzite and rise to a maximum altitude in Dugger Mountain of 2,130 feet, approximately 1,200 feet above the average altitude of the land surface to the west. They extend from the Indian Mountains, on the Georgia line, southwestward for 40 miles to Coldwater Mountain, south of Anniston. The ridges are separated from the mountainous country of the inner edge of the Piedmont Upland by Choccolocco Valley, whose floor ranges between 600 and 700 feet in altitude. Nance's Creek occupies a narrow valley between Choccolocco and Dugger mountains, and the city of Anniston occupies a transverse synclinal valley between the south end of Choccolocco Mountain and Coldwater Mountain. Complex faulting repeats parts of the Weisner quartzite section and has caused the discontinuity of the ridge.

Boundaries.—The Weisner Ridge district includes the quartzite mountains and the Choccolocco Valley. On the east the boundary follows the edge of the upfaulted Talladega slate along the east side of Choccolocco Valley. East of this line is the rough mountainous country of the inner Piedmont Upland. On the west the boundary follows the west side of Indian, Choccolocco, and Coldwater mountains. The greater part of this district is included in the Anniston quadrangle.

COOSA VALLEY

The Coosa Valley district extends for 100 miles north and south across Cherokee, Calhoun, St. Clair, Talladega, and Shelby Counties and attains a maximum width of 20 miles. Although it contains a variety of

topographic features, which are discussed in the following paragraphs, the greater part of the district may be characterized as a mature plain with structural ridges of low relief.

Northwest of the Coosa River in Cherokee County (Fort Payne quadrangle) Shinbone Valley marks the outcrop of the Mississippian limestones on the eastern edge of Lookout Mountain. It is a narrow but uniform valley and is traversed by the Tennessee, Alabama and Georgia Railway between Chattanooga and Gadsden. East of this valley and rising 250 feet above it is Shinbone Ridge, formed by the resistant westward-dipping beds of the Red Mountain formation. In the northern part of Cherokee County the Broomtown Valley, developed upon the cherty Cambrian and Ordovician dolomites, has an irregular rolling floor. On the east it adjoins Tucker Ridge, formed by the Red Mountain formation. Faulting repeats the Red Mountain formation farther east along the Georgia State line, in Gaylord Ridge.

Along the Coosa River from the State line to Gadsden is a broad belt of low rolling country developed upon the outcrop of the thick shale of the Conasauga formation. To this belt the older writers⁽¹⁾ applied the name "Flatwoods". The land surface has little relief and ranges from 500 to 650 feet above the sea.

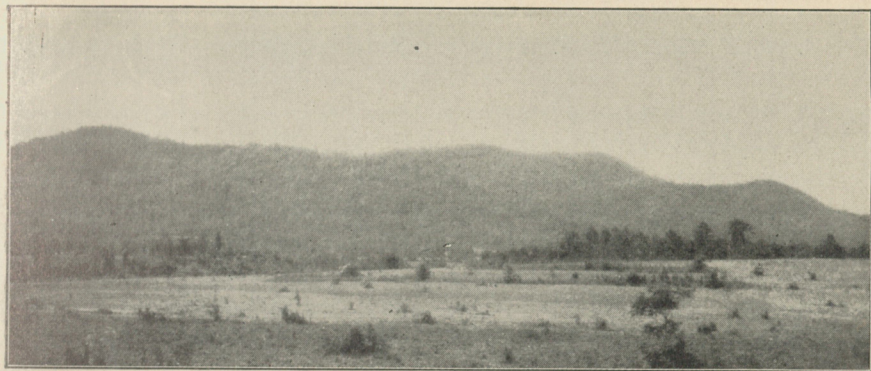
South of the Flatwoods the relief increases somewhat, and several structural ridges in which resistant formations crop out are present. The most conspicuous of these are Mount Weisner, formed of Weisner quartzite; Craig and Frog mountains, formed of Frog Mountain sandstone; Colvin and Dry Creek mountains (Anniston quadrangle), formed of the Red Mountain formation; the Talladega Hills (Talladega quadrangle) and Columbia Mountain, formed of Weisner quartzite.

Boundaries.—The western boundary of the Coosa Valley follows the eastward-facing escarpment of Lookout Mountain southwest to Gadsden, crosses the open ends of Big Canoe and Cahaba valleys and then follows the most eastern of the Coosa Ridges throughout its length. The eastern boundary follows the western margin of Indian, Choccolocco, and Coldwater mountains to the Calhoun and Talladega county line and thence runs southwest along the western slope of the Talladega and Rebecca mountains to Sylacauga. From Sylacauga it follows the eastern margin of the Talladega slate to the edge of the Coastal Plain.

The Rome, Fort Payne, Anniston, Springville, Talladega, Vandiver, and Columbiana quadrangles cover this District.

(1) McCalley, Henry, On the Coosa Valley region, p. 22, 1897.

PLATE 2



ALPINE MOUNTAIN, TALLADEGA COUNTY

One of the minor structural ridges of Weisner quartzite within the Coosa Valley district. Photograph by Charles Butts.



View looking northeast over the Coosa Valley with the Weisner Ridges in the distance. Rock Run, Cherokee County. Photograph by W. B. Jones, 1926.

COOSA RIDGES

The Coosa Ridges form a belt 5 miles wide extending approximately 50 miles from northeast to southwest across St. Clair and Shelby counties. The district is characterized by a series of parallel linear ridges formed by monoclinical resistant sandstones and separated by shale valleys. Oak, Double Oak, Double, Backbone, and Shoal Creek mountains are the most prominent of these ridges. They attain a maximum altitude of 1,500 feet, rising 600 feet above the valley floors. The Coosa coal field lies within the southern part of the district. Tributaries of the Coosa River drain the area, cutting through ridges in narrow gaps at short intervals. The surface is rugged, and in the southern half there are few east-west roads.

Boundaries.—The western boundary is formed by the crest of Double Oak, Oak, and Shoal Creek mountains, which rise 500 feet above Shoal Creek valley (the most eastern minor valley in the Cahaba Valley district), to the west. On the east the boundary follows the most eastern sandstone ridge passing through East Saginaw (Vandiver quadrangle) and just west of Eden and Ragland (Springville quadrangle). This line follows the faulted outcrop of the Pottsville formation, and the linear topography upon the Pennsylvanian rocks is in sharp contrast with the rolling surface, without elongation which is developed upon the Floyd shale. On the northeast the boundary is formed by the Coosa River, which, for a short distance, crosses the strike of the formations.

CAHABA VALLEY

The Cahaba Valley lies between the Cahaba Ridges and Coosa Ridges and extends for 75 miles northeast across Bibb, Chilton, Shelby, Jefferson, and St. Clair counties. It averages between two and three miles in width but at its south end widens to about 10 miles. It is developed upon a faulted monocline, and its topographic features are the result of weathering processes operating upon a stratigraphic section which includes soluble limestones and dolomites, easily eroded shales, and resistant chert beds.

In the northern portions of the district is a central valley excavated in Ordovician limestone and occupied by Cahaba Valley Creek. Bordering this valley on the west is a long ridge known as Newhope Mountain, formed by the chert-bearing Cambrian or Ordovician dolomites. This ridge is flanked on the west by a narrow corridor-like valley (Little Valley on Bessemer and Vandiver topographic maps), excavated in the Rome

formation. On the east side of the central valley is Little Oak Ridge and farther north Bear Creek Mountain (Springville quadrangle), formed by the resistant Fort Payne chert. Between this ridge and the outer sandstone mountain of the Coosa Ridges district is a narrow valley excavated upon the outcrop of the Floyd shale. South of Siluria the district widens and its linear character gives way, to some extent, to a rolling and rounded topography which continues southward to the Coastal Plain.

Boundaries.—On the west the Cahaba Valley district is bounded by the outer edge of the corridor-like Little Valley, developed upon the shales of the Rome formation east of the Helena fault. This boundary continues to the north end of the Cahaba Ridges, and from that point northeast the Canoe Creek Mountains separate the Cahaba and Big Canoe valleys. On the south the district boundary is formed by Oak, Double Oak, and Backbone mountains of the Cahaba Ridges, which rise 500 feet above the minor valley (Shoal Creek Valley) occupying the Floyd shale outcrop. The Cahaba Valley opens into the Coosa Valley on the northeast without a topographic break; hence that boundary is generalized. The southern boundary is formed by the inner edge of the Coastal Plain and the faulted margin of the Piedmont Upland.

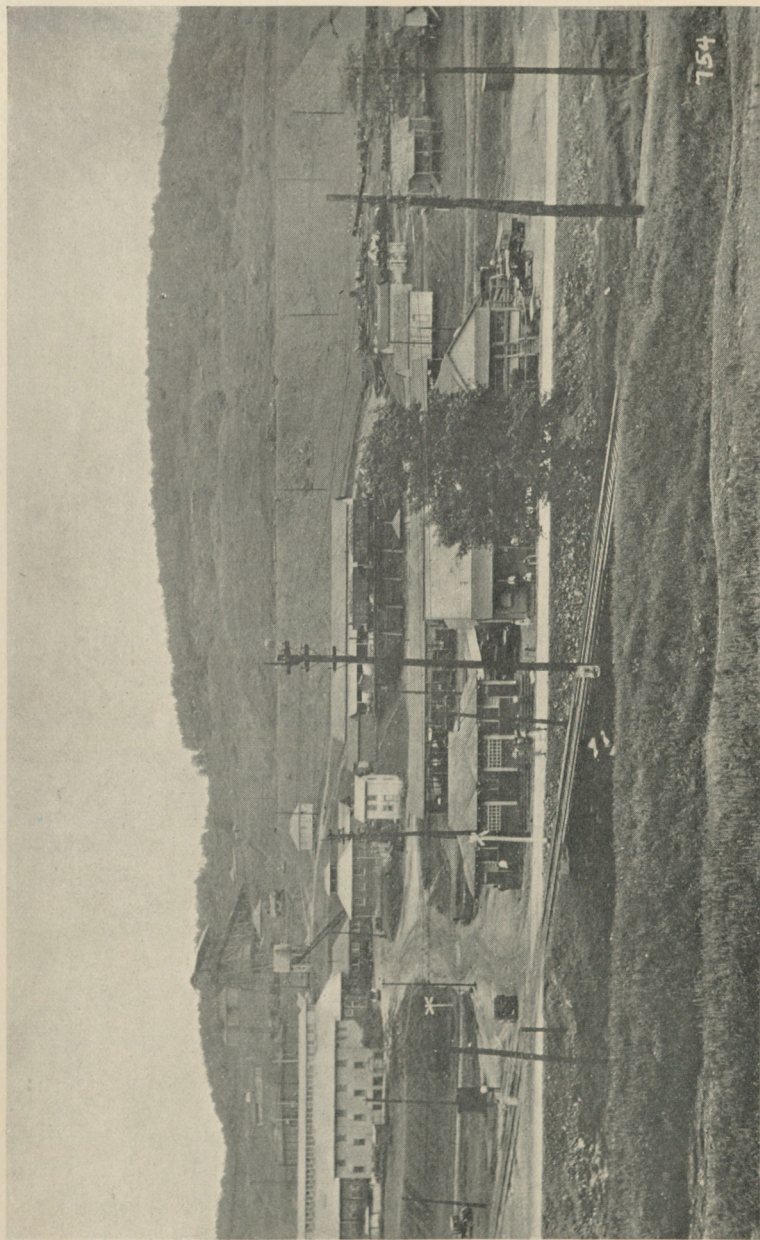
CAHABA RIDGES

The term "Cahaba Ridges" was used by Butts⁽¹⁾ to include all of the ridge country lying between the Birmingham-Big Canoe Valley and the Coosa Valley in Bibb, Jefferson, Shelby and St. Clair counties. The writer retains Butts' name but restricts it to the district bounded by the Birmingham-Big Canoe Valley and the Cahaba Valley, thus making it nearly coextensive with the Cahaba coal field. The writer divides the remainder of Butts' "Cahaba Ridges" into the Cahaba Valley district and the Coosa Ridges district.

The Cahaba Ridges as thus restricted comprise an area approximately 65 miles long from northeast to southwest and five miles in average width, although near its southern end it widens to a maximum of 15 miles. It is characterized by a number of parallel northeastward-striking ridges formed by massive sandstone and conglomerate beds within the Pottsville and Parkwood formations. Little Shades Mountain, Shades Mountain, Bluff Ridge, Bee Ridge, Pine Mountain, and Chestnut Ridge are the most conspicuous. These ridges rise 200 to 500 feet above the intervening

(1) Butts, Charles, *Geology of Alabama*, fig. 1, 1926.

PLATE 3



East Red Mountain, Birmingham Valley district, near Bessemer, Jefferson County. Shows old open cuts and Muscoda No. 4 mine of the Tennessee Coal, Iron & Railroad Co. Photograph by W. B. Jones, 1928.

shale valleys, to a maximum altitude of 1,200 feet above the sea. Toward the south the linear character of the topography becomes less pronounced.

The district is drained by the Cahaba River, which occupies an intrenched meandering valley cutting back and forth through the ridges.

Boundaries.—On the west the district adjoins the Birmingham-Big Canoe Valley, and the boundary follows the westward-facing escarpment of Bald Ridge, Little Shades Mountain, and Bluff Ridge. This escarpment, overlooking Shades Valley, is 200 to 400 feet in height and is continuous throughout the length of the district. On the east the boundary follows the Helena fault, where the Pottsville formation is in contact with the older Paleozoic rocks. Topographically this boundary along the northern half of the fault is marked by a narrow, corridor-like valley (Little Valley, in the Bessemer quadrangle), developed in Rome shale. Farther southwest the corridor opens into a wider shale valley and the boundary follows the eastern edge of the rugged country north and west of the Little Cahaba River. On the south the end of the linear topography marks the inner edge of the Coastal Plain.

The Cahaba Ridges lie within the area included in the Springville, Leeds, Vandiver, Bessemer, Montevallo, and Brookwood quadrangles.

BIRMINGHAM-BIG CANOE VALLEY

The Birmingham-Big Canoe Valley district extends for 90 miles across Etowah, St. Clair, Jefferson, Bibb, and Tuscaloosa counties. Its width ranges from 4 to 8 miles. It is developed upon a faulted asymmetrical anticline which exposes soluble limestones and dolomites, the Floyd shale, the resistant sandstones of the Red Mountain formation, and the Fort Payne chert. The southern half, south of the end of Blount Mountain, includes the Opossum Valley, developed upon the chert-free Ketona dolomite; the Jones Valley, upon Conasauga limestone and Ketona dolomite; and the Shades Valley, upon Floyd Shale. Separating Opossum and Jones Valleys is Flint Ridge, a low rounded divide that marks the outcrop of the chert-bearing Copper Ridge dolomite. Red Mountain is a long continuous ridge on the east side of Jones Valley and 400 feet above it. It is formed by the southeastward-dipping Red Mountain formation and its capping of Fort Payne chert. To the east of Red Mountain and separated from Jones Valley by it is Shades Valley. The Birmingham Valley is offset to the east at the south end of Blount Mountain and continues northeastward as far as Gadsden, where it opens into the Big Canoe Valley.

The valley floor in the southern part of the district is higher than the main drainage lines in the adjoining districts, and the streams in the Birmingham Valley empty into both the Black Warrior and Cahaba Rivers. The Big Canoe Valley is drained by Big Canoe Creek, which flows to the northeast and discharges into the Coosa River near Gadsden.

Boundaries.—On the west the boundary of the Birmingham Valley follows the outward-facing escarpment formed by the Boyles sandstone member of the Pottsville formation and the edge of Blount Mountain bordering the Big Canoe Valley. On the southeast Little Shades Mountain has a steep escarpment overlooking the Shades Valley, and north of the northeast end of the Cahaba Ridges district the boundary between Big Canoe and Cahaba Valleys follows the crest of the Canoe Creek Mountains (Springville quadrangle), formed on the upturned edge of the Fort Payne chert. On the northeast the Big Canoe Valley opens into the Coosa Valley, and the boundary is arbitrarily drawn due south from Gadsden. On the south end a tongue of the Tuscaloosa formation of the Coastal Plain extends up the valley, and there is no sharp topographic break to mark its lower boundary. The district is shown on the maps of the Brookwood, Bessemer, Birmingham, and Springville quadrangles.

CUMBERLAND PLATEAU SECTION OF THE APPALACHIAN PLATEAUS

The Cumberland Plateau in Alabama is a submaturely to maturely dissected upland developed largely upon nearly flat-lying rocks of Pennsylvanian age but containing anticlinal valleys of older Paleozoic limestones and dolomites. Its upland surface was developed after the deposition of the rocks of the Pottsville and probably before the encroachment of the Upper Cretaceous sea. This surface, usually known as the Cumberland Plateau,⁽¹⁾ was subsequently uplifted and tilted to the south. In northern Alabama its altitude is 1,500 to 2,000 feet, and at its south end, where it passes under Coastal Plain deposits, 500 feet. Drainage of subsequent cycles has roughened the upland surface and deepened the limestone valleys.

In general the surface of the Cumberland Plateaus is higher than that of the adjoining provinces. An outward-facing escarpment along the eastern edge of Lookout and Blount Mountains and the Warrior Basin forms the eastern boundary. On the north the outward-facing escarpment of Little Mountain overlooks the Highland Rim section of the Interior Low Plateaus. On the west and south the boundary follows the ragged inner edge of the Coastal Plain, where the older Pennsylvanian rocks pass beneath the irregularly bedded sand, clay, and gravel of the Tuscaloosa formation.

LOOKOUT MOUNTAIN

Although this and some other features of relief are shown on all maps as mountains, they are really linear plateaus and in general will be called plateaus in this text.

Lookout Mountain is a narrow, synclinal, submaturely dissected, flat-topped remnant of the Cumberland Plateau which extends from Chattanooga, Tenn., on the north to Gadsden, Ala., on the south, a distance of approximately 75 miles. At the Alabama-Georgia State line it is seven miles wide and has a maximum altitude of 1,700 feet, and at its southern end it is three miles wide and has an altitude of 1,200 feet. Broad, undissected remnants of the plateau surface are preserved at its north end, but toward the south its roughness increases, and in Etowah County and southern Cherokee County it is highest at its edges and is depressed in the mid-

⁽¹⁾ Hayes, C. W., and Campbell, M. R., *op. cit.*

dle along the course of the southward-flowing Black Creek, which drains the southern half of the plateau. Little River, which flows to the south and leaves the plateau near Firestone, in Cherokee County, occupies a narrow, canyon-like valley in its lower course, which is locally known as Little River Gulf.

The structure of Lookout Mountain is synclinal. Sandstone and shale of the Pottsville formation, of Pennsylvanian age, dip under the mountain with low marginal angles and flatten at its middle end.

Boundaries.—The boundaries of Lookout Mountain are sharply defined. On the east it overlooks Shinbone Valley, a minor division of the Coosa Valley district, rising in a cliff 500 to 1,000 feet above the valley floor. This cliff marks the boundary between the Cumberland Plateau on the west, of which Lookout Mountain is a part, and the Tennessee section of the Valley and Ridge province on the east. The western boundary of Lookout Mountain is a shale and sandstone cliff rising from 400 to 750 feet above Little Wills Valley, the most eastern of the tripartite valley that constitute the Wills Valley district.

On the south, at Gadsden, Pennsylvanian rocks are cut off by a fault, and Lookout Mountain rises about 500 feet above the Coosa Valley.

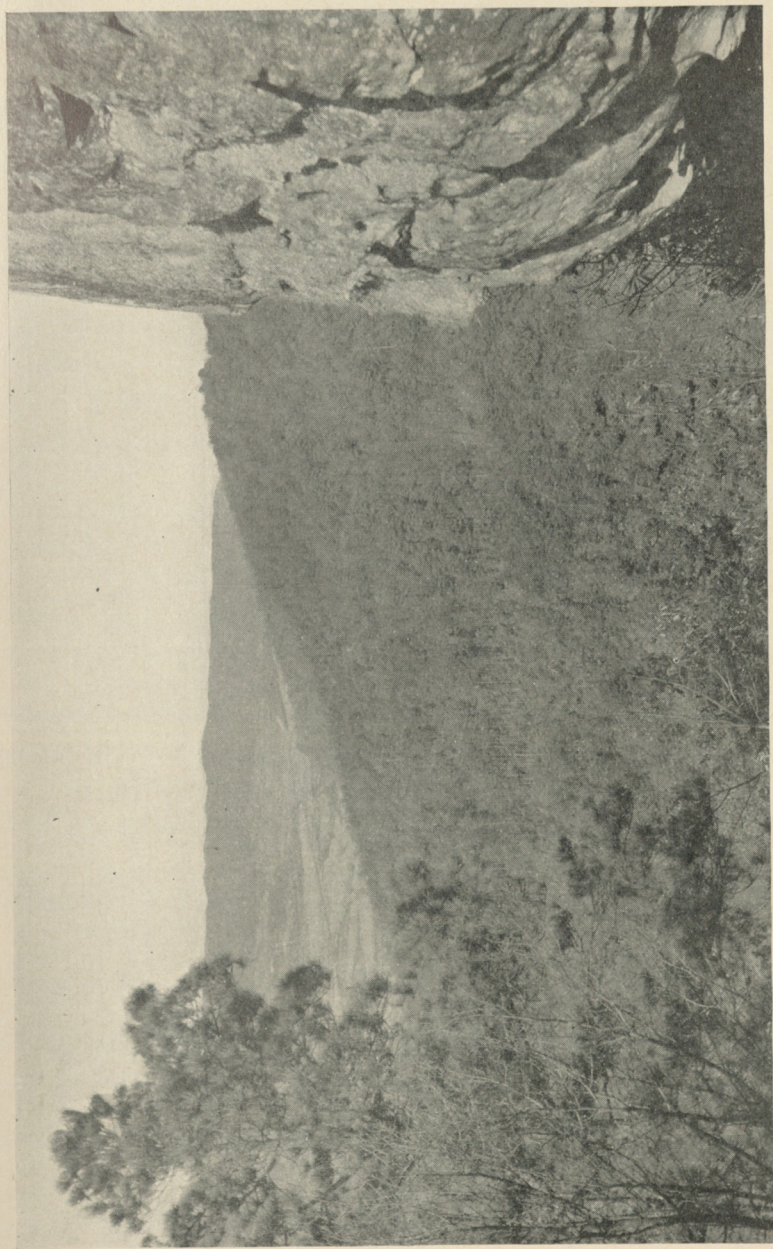
The whole of Lookout Mountain in Alabama is shown upon the Stevenson, Fort Payne, and Gadsden topographic maps.

WILLS VALLEY

Wills Valley extends southwestward from the Georgia line across DeKalb and Etowah Counties for 70 miles and ends in Greasy Cove, southwest of Gadsden. It has an average width of five miles between the plateaus of Sand Mountain on the west and Lookout Mountain on the east. Throughout the greater part of its length it is composed of three limestone valleys separated by ridges of resistant sandstones of the Red Mountain formation. The middle and largest of these valleys is Big Wills Valley, developed upon the dolomite of Cambrian or Ordovician age. It has an average width of one mile and is drained by Wills Creek, which flows to the southwest and empties into the Coosa River south of Gadsden. North of Valley Head, in DeKalb County, Wills Creek heads on the south side of a low divide 1,000 feet above the sea. North of this divide the drainage goes into the Tennessee River near Chattanooga.

Little Wills Valley, on the east, is narrower. It is excavated in the Mississippian limestones on the flank of the Wills anticline and is separated

PLATE 4



View looking north along the southwestern edge of Lookout Mountain, Etowah County. In the distance is the valley of Little Wills Creek (Wills Valley district.) Photograph by W. B. Jones, 1926.

PLATE 5



Nocalula Falls on Black Creek. South end of Lookout Mountain, near Attala, Etowah County. Photograph by W. B. Jones, 1926.

from Big Wills Valley by East Red Mountain (not to be confused with Red Mountain, in the Birmingham district), which rises to an altitude of 1,250 feet or 500 feet above the valley floor. The south half of Little Wills Valley is occupied by the southward-flowing Little Wills Creek, which joins Wills Creek at Attalla. The northern half of this valley is drained by tributaries of Wills Creek. These streams cut through East Sand Mountain in narrow gaps at intervals of 2 to 4 miles.

Dugout Valley⁽¹⁾ lies west of Big Wills Valley and is separated from it by West Red Mountain. Like Little Wills Valley, it is cut in Mississippian limestones on the flanks of the Wills anticline, but it is narrower and less continuous, owing to the position of the Wills Valley fault, which follows the west limb of the anticline and, in places, cuts off the outcrop of the Red Mountain formation. Dugout Valley is drained by tributaries of Wills Creek which cut through the intervening ridge at short intervals. West Red Mountain attains a maximum altitude of 1,280 feet in the latitude of Fort Payne but throughout its length is not so pronounced a feature as Red Mountain Ridge.

Greasy Cove, which forms the southwest end of Wills Valley where the limestones of the anticline plunge beneath the Pottsville capping, has the tripartite division which is characteristic of the district.

Boundaries: Wills Valley lies between Sand and Lookout Mountains and is co-extensive with the outcrop of pre-Pottsville rocks. Throughout its length it is bounded by the steep outward-facing sandstone escarpments of the mountains which form a definite physiographic break. Southwest of Attalla the line drawn between the Cumberland Plateau and the Appalachian Valley crosses the open end of Wills Valley that connects the eastward-facing escarpments of Lookout and Blount Mountains.

The Stevenson, Fort Payne, Gadsden, and Springville topographic maps show the whole of Wills Valley in Alabama.

SAND MOUNTAIN

Sand Mountain (also known as Raccoon Mountain) is a long, sub-maturely dissected synclinal plateau. On the south, in Alabama, it gradually merges with the Warrior Basin and with Blount Mountain, and north of the Tennessee River, in Tennessee, it is continuous with Walden Ridge. In Alabama the mountain has a length of 80 miles and a width of 8 to 18 miles. The altitude of the undissected area on the north, at the State

⁽¹⁾ Called "Sand Valley" by McCalley in his report on the Coosa Valley region (1897), p. 9. "Dugout Valley" appears on the Gadsden topographic map (surveyed in 1885).

line, is 1,700 feet. The surface slopes gently to the south to an altitude of approximately 1,000 feet where it merges with the Warrior Basin. Sand Mountain lies wholly within Jackson, DeKalb, Marshall, Blount and Etowah Counties. Like Lookout Mountain, it is highest on the edges of the upland, particularly near its south end along headwaters of Locust Fork, which flows south into the Warrior Basin. The drainage all goes to the west into the Tennessee River, as the divide between the Tennessee and Coosa drainage basins follows the eastern margin of the plateau. The streams occupy valleys with gently sloping sides in the upper parts of their courses, but downstream where the streams leave the plateaus and flow into the Sequatchie Valley on the west these give way to steep-sided gorge-like valleys.

The rocks of Sand Mountain are sandstones and shales of the Pottsville formation, of Pennsylvanian age. At the margins of the plateau they dip inward and rapidly flatten into an elongated saucer-shaped syncline.

Boundaries.—Except at the southwest end, where it merges with Blount Mountain and the Warrior Basin, the boundaries of Sand Mountain are distinct and coincide with the edge of the outcrop of the Pottsville formation. On the east a steep escarpment 500 to 1,000 feet high overlooks Wills Valley and, in Etowah County, the north end of the Murphree Valley. On the west the sandstone escarpment, together with the escarpment formed by the truncated beds of the underlying Bangor limestone, rises 400 to 1,000 feet above the Sequatchie Valley and is highest in the north.

Sand Mountain in Alabama is shown on the Stevenson, Fort Payne, Scottsboro, and Gadsden topographic maps.

MURPHREE VALLEY

Murphree Valley extends from northeast to southwest for a distance of approximately 40 miles in Etowah, Blount, and Jefferson Counties. Like Wills and Sequatchie valleys, it is a faulted, tripartite valley of moderate relief. Its average width is two and one-half to three miles. North of the latitude of Oneonta a thrust fault forms its eastern margin, and the older Paleozoic rocks that form the valley floor dip steeply to the northwest. Throughout the length of this fault the valley is divided into two parts, the eastern and larger one developed upon Cambrian or Ordovician dolomites and the western one upon Mississippian limestones. They are separated by West Red Mountain (continuous with the ridge of that name in the Birmingham Valley but not to be confused with the West Red

Mountain in Wills Valley), which rises 200 to 300 feet above the valley floor, to a maximum altitude of 1,100 feet. Both of these inner valleys are drained by tributaries of the Black Warrior River that break through West Red Mountain and the outer ridge along Sand Mountain at short intervals. In the southwestern half of Murphree Valley Mississippian limestones are present on the east and there are three narrow valleys—a central one in Cambrian and Ordovician dolomites on the crest of the anticline and lateral ones in Mississippian limestones on the flanks. They are separated by West Red Mountain and Gravelly Ridge or Chert Mountain (Birmingham quadrangle). On the south Murphree Valley connects with the Birmingham Valley.

Boundaries.—Murphree Valley lies between Blount and Sand Mountains and occupies the outcrop of the older Paleozoic formations. Although its floor is higher than that of Locust Fork on Sand Mountain, the sandstones on the east side of the mountain are upturned and stand as a high ridge overlooking the valley. On the southeast the escarpment of Blount Mountain rises 200 to 400 feet above the valley floor and forms a definite boundary between the districts.

Murphree Valley lies within the Gadsden, Springville, and Birmingham quadrangles.

BLOUNT MOUNTAIN

Blount Mountain is a southwestern continuation of Sand Mountain. It lies between the south end of Wills Valley and the Birmingham-Big Canoe Valley on the east and the Murphree Valley on the west, in Etowah, Blount, St. Clair and Jefferson Counties. It is an elongate, synclinal, sub-maturely to maturely dissected remnant of the Cumberland Plateau. Its length from northeast to southwest is about 35 miles, and its width ranges from four to six miles. Mount Chandler, on the east side of Blount Mountain, protrudes to the northeast, forming a flat-topped spur eight miles long and two miles wide.

On the north end, at its juncture with Sand Mountain, the altitude of the summits of Blount Mountain is about 1,400 feet. The old plateau surface slopes to the south and west and is approximately 1,250 feet above the sea at the south end of the mountain. Mount Chandler, which is separated from the main plateau by a narrow valley (McGlendon Gap), has a flat top at an altitude of 1,500 feet. Blount Mountain, like Sand and Lookout Mountains, is roughly saucer-shaped, with the highest altitude along its margins and an interior drainage (Locust Fork and Black-

burn Fork of the Black Warrior River). The streams occupy valleys with gently sloping sides in their upper courses and steep-sided gorgelike valleys where they leave the mountain.

Boundaires.—Blount Mountain is coextensive with the outcrop of the shales and sandstones of the Pottsville formation. On the east a sandstone escarpment rises 250 to 600 feet above Greasy Cove (the south end of Wills Valley), and the Birmingham-Big Canoe Valley. On the west the escarpment is lower, ranging between 150 and 350 feet, and the slope is more gentle. To the northeast Blount Mountain joins Sand Mountain, and no definite boundary between them can be drawn.

The mountain lies within the areas shown upon the Birmingham, Springville, and Gadsden topographic maps.

SEQUATCHIE VALLEY

The Sequatchie Valley, which is a pronounced topographic feature in Tennessee, continues to the south for 100 miles into Alabama, where it is known as the Brown or Blountsville Valley. Because of the continuity of the valley and the fact that it is best developed north of the State line, the Tennessee name is here retained for the Alabama portion.⁽¹⁾ It is developed upon the crest of the Sequatchie anticline and at its south end has the tripartite character possessed by all the anticlinal valleys in the Cumberland Plateau. Within Alabama its average width is approximately five miles.

The northern half is occupied by the Tennessee River, which flows partly upon Ordovician and partly upon Mississippian limestones, crossing the intervening ridge, formed by the resistant Red Mountain and Fort Payne formations, in wide gaps. North of Scottsboro a fault that cuts off the ridge-making formations marks the west side of the district, so that the third or most western minor valley is absent. In the latitude of Guntersville the Tennessee River turns sharply to the west and leaves the Sequatchie Valley.⁽²⁾

South of Guntersville to the Blount County line the valley is in two parts, Brown Creek occupying the outcrop of the Ordovician limestones on the west and Big Spring Creek the outcrop of the Mississippian limestones on the east. Between the Blount-Marshall County line and Blountsville is a divide separating the northward drainage into the Tennessee River

(¹) See McCalley, Henry, On the Tennessee Valley region, pp. 20-22, 1896.

(²) A repetition of the much discussed geologic history of the Tennessee River is here out of place. The older papers of Hayes and Campbell have previously been cited. See also Adams, G. I., The course of the Tennessee River and the physiography of the southern Appalachian region: Jour. Geology, vol. 36, pp. 481-493, 1928.

PLATE 6



View looking northwest from road south of Guntersville, Marshall County, showing the northwestern rim of Sand Mountain and the Sequatchie Valley. Photograph by W. B. Jones, 1926.

from the southward drainage into the Black Warrior River. This divide marks the head of the actual valley, but the topographic expression of the southwestward-continuing anticline justifies the extension of the Sequatchie Valley district southwest to the point where the older rocks disappear under the younger Pottsville formation. At the southwest end of the district two small minor valleys whose floors are higher than the drainage lines on Sand Mountain to the east and the Warrior Basin to the west are separated by a high medial ridge formed by the Hartselle sandstone, Fort Payne chert, and older rocks.

Boundaries.—North of Guntersville, where the Tennessee River turns to the west, the eastern boundary of the Sequatchie Valley is formed by the steep escarpment of Sand Mountain, which rises 600 to 800 feet above the valley floor. South of Guntersville this escarpment becomes lower, and south of the Marshall-Blount County line, where the drainage lines on Sand Mountain are at a lower altitude than those in the valley, a narrow sandstone ridge marks the boundary. On the west side the boundary between the Jackson County Mountains and the Sequatchie Valley follows the faulted contact between the Ordovician limestones and the Mississippian limestones which project to the east in long spurs whose upper ends are capped by the Pottsville formation. The boundary continues to the southwest along the edge of Gunters Mountain (Scottsboro and Gadsden quadrangles) and the eastward-facing escarpment of the Warrior Basin just south of the Tennessee River, which rises 500 feet above the valley. South of the juncture of the Cullman, Marshall, and Blount County lines this escarpment becomes lower and finally gives way to a narrow steep outward-dipping sandstone ridge. South of Blountsville the district is bounded by the narrow zone in which a markedly northeastern elongation of topographic features gives way to a land surface developed upon nearly horizontal rocks.

The whole of the Sequatchie Valley in Alabama is shown upon the Scottsboro, Stevenson, Gadsden, Cullman and Birmingham topographic maps.

WARRIOR BASIN

The Warrior Basin lies mainly in Winston, Cullman, Walker, Jefferson, and Tuscaloosa Counties. It is a broad, synclinal, submaturely to maturely dissected plateau about 80 miles in length from north to south and 60 miles in width. At its north end, south of the Tennessee River, its summit has an altitude of 1,100 feet, but it slopes gently southward to an

altitude of about 500 feet where it is covered by the inner edge of the Coastal Plain. The plateau surface was developed upon sandstones and shales of Pottsville age. Post-Cretaceous erosion has roughened the old surface, leaving only a few flat-topped areas in the northern part. The Black Warrior River, which flows south end empties into Mobile Bay, drains the basin. The streams occupy steep-sided valleys, many of which, in the southern part, are gorgelike. At Tuscaloosa, where the Black Warrior River leaves the basin, it occupies a narrow valley with cliff-like sandstone walls 100 feet or more in height. Below Tuscaloosa the river enters the Coastal Plain, and its valley is very wide.

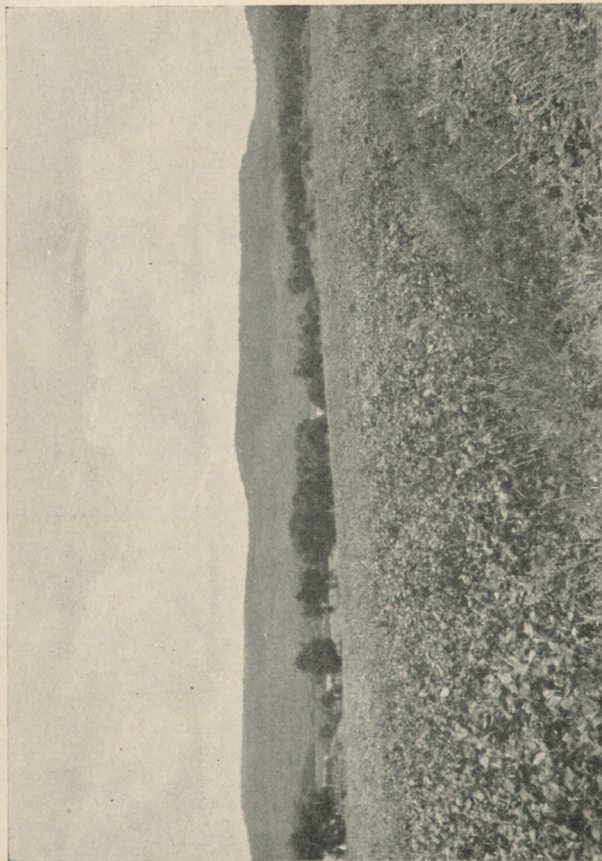
Boundaries.—The Warrior Basin district is coextensive with the outcrop of the Pottsville formation west of the Birmingham and Sequatchie Valleys, and south of the Tennessee River. On the north it adjoins the Moulton Valley, and a northward-facing sandstone escarpment 200 to 500 feet in height forms the boundary. This escarpment also serves as the boundary between the Jackson County Mountains district and the Warrior Basin, east of the east end of the Moulton Valley.

On the southeast the basin adjoins the south end of the Sequatchie Valley ("Browns Valley" on topographic maps of the Gadsden and Cullman quadrangles). A Pottsville escarpment overlooks the Sequatchie Valley for a few miles south of the Tennessee River, but as the valley floor rises to the southwest this escarpment gives way to a narrow ridge formed by the upturned edge of the Boyles sandstone member of the Pottsville formation.⁽¹⁾ Southwest of Blount Springs, near the end of the Sequatchie Valley district, the "valley" is higher than the adjoining Warrior Basin, and Pond and Blackburn Mountains (Birmingham quadrangle), which are within the valley, rise above the eroded plateau surface. Between the Sequatchie Valley district and the south end of the Murphree Valley the Warrior Basin merges imperceptibly with the lower end of Sand Mountain. Southwest of Murphree Valley the boundary between the Warrior Basin district of the Cumberland Plateau and the Birmingham Valley district of the Valley and Ridge province follows the edge of the Pottsville outcrop, where the upturned Boyles sandstone member forms a narrow ridge 50 to 150 feet in height.

On the west and south the old plateau surface is buried under the irregularly bedded sand, gravel, and clay of the Tuscaloosa formation, which forms the inner edge of the Coastal Plain. This boundary is ragged and it is generalized on the accompanying map. Where major streams leave the Warrior Basin and enter the Coastal Plain (as at Tuscaloosa) the

⁽¹⁾ Described by Butts, Charles, U. S. Geol. Survey Geol. Atlas, (No. 175), p. 8, 1910.

PLATE 7



Monte Sano, Madison County, the most western remnant of the Jackson County Mountains district of the Cumberland Plateau. The rolling surface of the Highland Rim is shown in the foreground. Photograph by W. B. Jones, 1926.

valleys widen and a flood plain is developed, but in the interstream areas there is a transition zone between the physiographic divisions.

JACKSON COUNTY MOUNTAINS

The Jackson County Mountains district comprises a roughly rectangular area in Marshall, Madison, and Jackson Counties 50 miles across from southwest to northeast and 25 miles wide from southeast to northwest. Approximately one-third of this area is occupied by mesas of Pottsville-capped remnants of the Cumberland Plateau and the remainder by stream valleys which have been cut into the Mississippian limestones that underlie the Pottsville formation. The plateau has been submaturely dissected, and a total relief of about 1,000 feet has been attained. The Pottsville remnants are flat-topped, and the surface of the plateau slopes to the south. Near the Tennessee line the altitude of the old plateau surface is 1,600 to 1,700 feet; in Gunter Mountain, just north of the Tennessee River, the altitude is 1,200 to 1,300 feet; and south of the Tennessee River the northward-facing Pottsville escarpment rises to 1,100 feet. The drainage is well developed and the lower courses of the main streams occupy wide, rolling limestone valleys. Upstream the valleys narrow and become steep-sided as their profiles rise in the section.

Boundaries.—The eastern boundary of this district follows the contact of the Mississippian limestones with the Ordovician limestones of the Sequatchie Valley. Pottsville-capped limestone spurs extend eastward to this line but do not cross it. Between these spurs along the boundary there is little topographic difference between the Jackson County Mountains district and the Sequatchie Valley, but to the west the land surface rises steeply to the old plateau level. The northward-facing Pottsville escarpment south of the Tennessee River in Marshall County forms a distinct boundary between the Jackson County Mountains and the Warrior Basin. It rises sharply from the river and forms a strong escarpment 400 to 500 feet in height. On the west the boundary between the Cumberland Plateau and the Highland Rim Plateau follows the west side of Monte Sano north from the Tennessee River and thence a little east of north along the Nashville, Chattanooga & St. Louis Railway to the Tennessee State line. East of this boundary Pottsville-capped remnants of the Cumberland Plateau dominate the land surface, and west of it there remain only a few isolated conical mountains from which the sandstones have not been removed.

LITTLE MOUNTAIN

Little Mountain, which extends for 60 miles from east to west across Colbert, Lawrence, and Morgan Counties, is a narrow outlying remnant of the Cumberland Plateau developed upon the southward-dipping monoclinical beds of the Hartselle sandstone, from which the overlying Bangor limestone has been stripped by erosion. In width it ranges from 8 to 10 miles. It is best developed in Colbert County, where its surface, along the northern escarpment, attains an altitude of 800 feet and slopes south to about 600 feet on the edge of the Moulton Valley. The interstream areas, though generally rounded, preserve scattered tracts of flat, plateau-like upland. The streams all flow north into the Tennessee River. They head in the Pottsville escarpment of the Warrior Basin, to the south, have wide rolling valleys developed upon the Bangor limestone in the Moulton Valley district, and cut through Little Mountain in narrow valleys deeply incised in the sandstone beds. To the east the topographic unity of Little Mountain becomes less marked, and the district ends just west of the Morgan-Marshall County line.

Boundaries.—The Little Mountain district occupies the outcrop area of the Hartselle sandstone south of the Tennessee River and north of the Warrior Basin. The gently southward-dipping beds have been cut off on the north and form a steep sandstone escarpment 100 to 250 feet in height which faces the Highland Rim Plateau and marks the boundary between the Interior Low Plateaus and the Appalachian Plateaus. This escarpment is best developed on the west and is less pronounced toward the east, finally disappearing in eastern Morgan County. On the south the boundary between Little Mountain and Moulton Valley follows the contact between the Hartselle sandstone and the Bangor limestone, where the dissected table-land gives way to the rolling limestone valley. On the west it disappears beneath the ragged inner edge of the Coastal Plain.

MOULTON VALLEY

Moulton Valley, just south of Little Mountain, lies almost wholly within Franklin, Lawrence, and Morgan counties. It is about 50 miles long from east to west and between three and ten miles wide. It is a rolling, open lowland of low relief whose altitude is between 575 and 650 feet. On the west, in the vicinity of Russellville, a thin veneer of gravel, sand, and clay of the Coastal Plain covers the valley floor. The valley is wide across Lawrence County and western Morgan County, but east of the

PLATE 8



Hartselle sandstone escarpment marking the northern boundary of the Little Mountain district, Colbert County.
Photograph by Charles Butts, 1929.

Louisville & Nashville Railroad it narrows at its junction with the northward-striking Cotaco Valley, which forms its east end. Streams that head in Moulton Valley or in the Warrior Basin, to the south, cut through Little Mountain in narrow gaps and empty into the Tennessee River.

Boundaries.—The northern boundary of Moulton Valley is transitional, as the rolling limestone valley gives way to the rougher surface developed upon the underlying Hartselle sandstone, but the break in the topography can be followed upon the topographic maps of the Tuscumbia and Cullman quadrangles. The southern boundary is formed by the steep northward-facing sandstone escarpment of the Warrior Basin (locally known as Sand Mountain but not to be confused with the Sand Mountain in the northeastern part of the State), which rises 200 to 500 feet above the valley floor. West of Russellville the valley passes under the Coastal Plain.

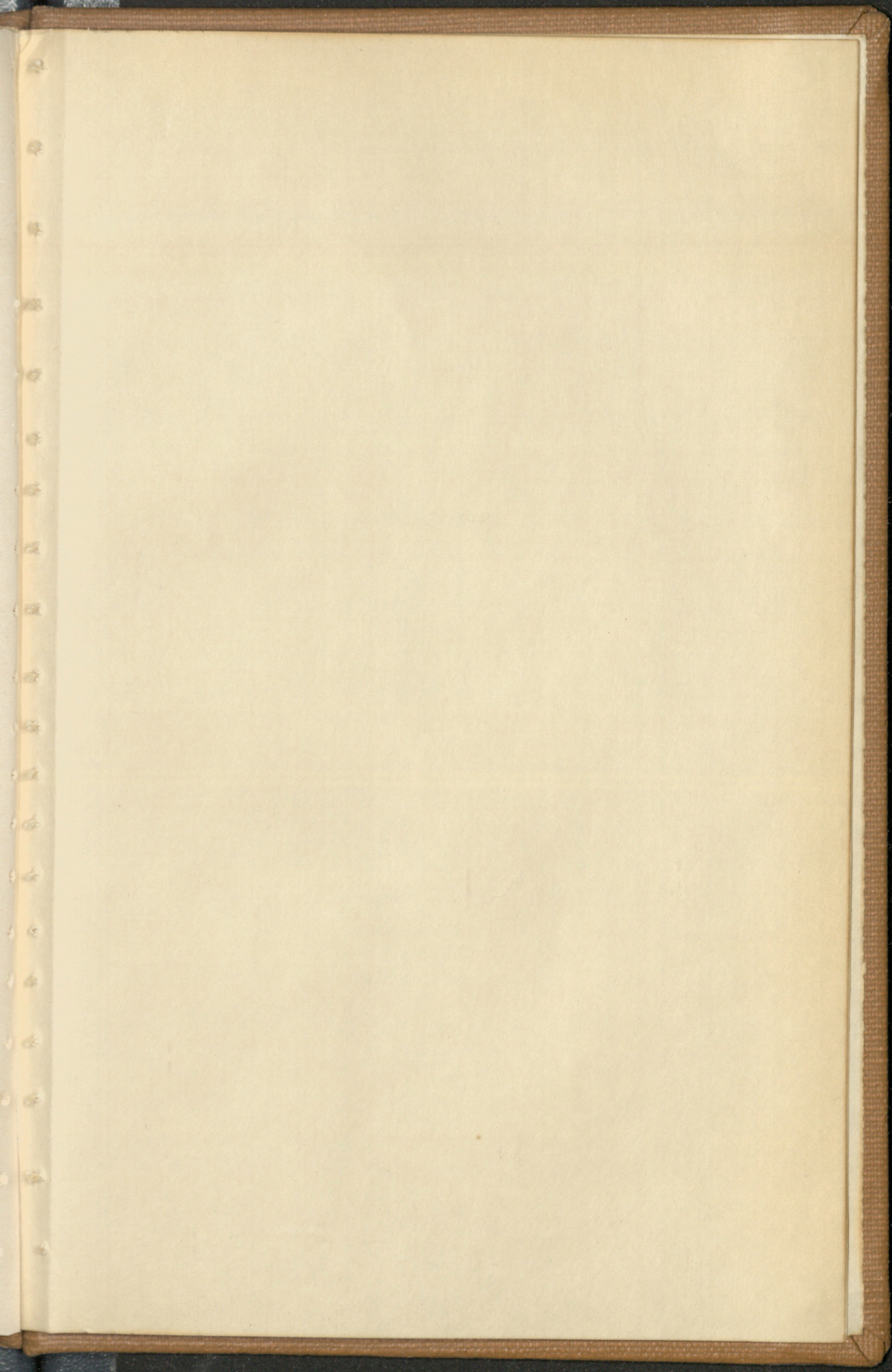
HIGHLAND RIM SECTION OF THE INTERIOR LOW PLATEAUS

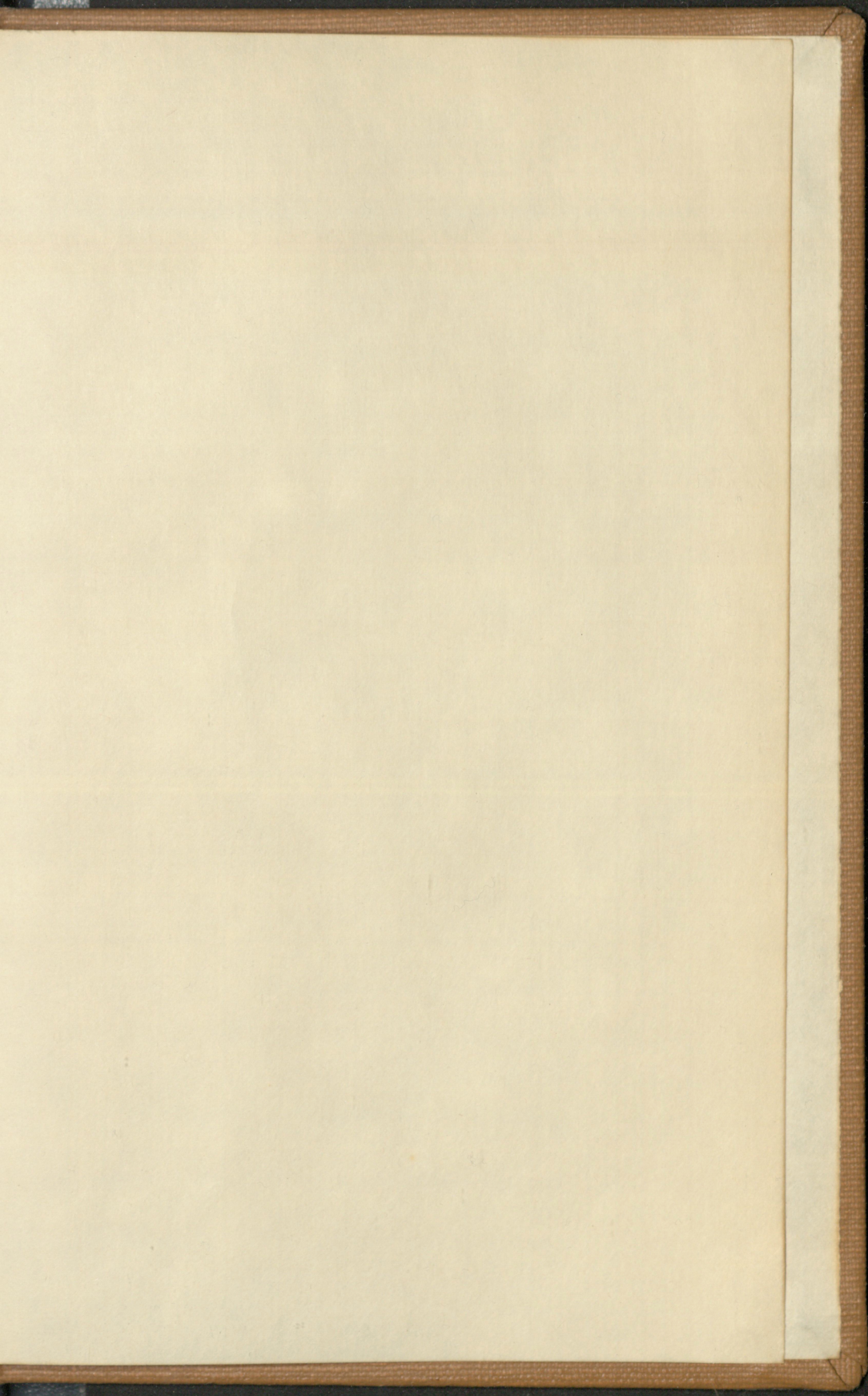
The Highland Rim, which is best developed in Tennessee, extends into Alabama and occupies an area 90 miles long from east to west and 20 to 40 miles wide. All of Lauderdale and Limestone Counties and parts of Madison, Colbert, Lawrence and Morgan Counties lie within this section of the Interior Low Plateaus.

The land surface is a rolling upland with a total relief of 400 feet. Its average altitude in Alabama is about 600 feet. North of the Tennessee River a number of southward-flowing streams occupy intrenched meanders with cliff-like walls, and steep limestone cliffs 200 feet in height border the Tennessee River. In Colbert, Lawrence and Morgan Counties, south of the Tennessee River, the outcrop of the Warsaw limestone is marked by generally interrupted drainage, and there are numerous sinks and springs, especially in the northeast corner of the Tuscumbia quadrangle. (See also soil map of Lawrence County.)

Boundaries.—In Alabama the boundary of the Highland Rim on the east follows the western slope of Monte Sano, crosses the Tennessee River, and follows the outward-facing escarpment of Little Mountain west to the Mississippi line. Throughout its length the boundary is marked by a conspicuous topographic break between the surface of the Cumberland Plateau, whose average altitude is 1,500 feet, and the Highland Rim, whose average altitude is 600 feet.

The topography of this section is shown upon the maps of the Iuka, Gravelly Springs, Muscle Shoals, Rogersville, Barton, Tuscumbia and Huntsville quadrangles.







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